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ABSTRACT

A study was conducted to examine some of the cognitive and linguistic factors that influence metaphor comprehension in young children. Presupposing that (1) the similarities between the topic and the vehicle in a metaphor comprise the metaphor's ground, (2) salience is the degree of prominence of a characteristic in relation to a concept, and (3) a directed comparison occurs when the topic is examined in terms of the vehicle (for example, "the surgeon is a butcher," where the surgeon is the topic and butcher is the vehicle), it was predicted that high salience grounds would be easier for children to identify than mixed salience grounds and that directed comparisons would be easier to comprehend than nondirected ones. Subjects were 72 preschool children, who were asked to identify the grounds between word pairs in statements that varied in salience, directed or nondirected linguistic form, and ordering of salience (topic to vehicle or vehicle to topic). The results indicated that the children were sensitive to the linguistic form of the statements and were able to identify the grounds of statements that were based on ordered, mixed salience that typifies metaphors. Mixed salience grounds were more difficult than high salience grounds. The children did not appear to engage in the type of directed processing that is most efficient for understanding metaphor. (HTH)

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Abstract

A Study of Young Children's Comprehension of Metaphorical Language. This study examined the ability of young children to identify similarities (i.e., grounds) between objects in similarity statements. The statements varied with respect to the salience of the ground (high vs. low), their linguistic form (directed vs. nondirected) and the ordering of salience (forward vs. reverse).

The results indicate that young children have several abilities and limitations with respect to comprehension of metaphorical language. They were sensitive to the linguistic form of the statements they heard and were able identify the grounds of statements that were based on the ordered, mixed salience that typifies metaphor.

However, mixed salience grounds were more difficult than high salience grounds. In addition, the results suggest that they may interpret nondirected similarity statements (i.e., X and Y are alike) as if they are statements of equivalence. Moreover, they do not appear to engage in the type of directed processing that is most efficient for understanding metaphor. Instead they appear to find similarities by generating high salient characteristics from either or both terms in a statement and then compare those properties.

metaphoric

Metaphor is one form of nonliteral language that appears regularly in all forms of discourse and is usually understood by adults (Lakoff & Johnson, 1980). However, developmental research indicates that younger children have difficulty with metaphorical language (Winner, Engel, & Gardner, 1980). The purpose of this study is to examine some of the cognitive and linguistic factors that influence metaphor comprehension in young children.

Characteristics and Structure of Metaphor

Predicative metaphors appear in the form, X is Y, where X and Y are referred to as the topic and vehicle, respectively (Richards, 1936). Metaphors assert identity between the topic and vehicle but are based only on similarities between the terms. For this reason they are considered to be indirect similarity statements (Ortony, 1979). For example, the metaphor, "The surgeon is a butcher," asserts equivalence between the surgeon and a butcher. In order to interpret the statement one must recognize that the surgeon is not literally a butcher but is only similar to a butcher in some way(s). The similarities between the topic and vehicle on which a metaphor is based comprise its ground (Richards, 1936). The ground in the example might be that the surgeon and butcher work on their subjects in a coarse way. Not all of the similarities between the topic and the vehicle become part of the ground (Ortony, 1979; Tourangeau & Sternberg, 1981). Some are irrelevant to the meaning of the metaphor. In the example, the fact that both the surgeon and the butcher are alive is an unimportant similarity and not part of the ground.

The nonliteralness of a metaphor originates in the salience relationship between the ground characteristics and the topic and

vehicle (Ortony, 1979). Salience is the degree of prominence of a characteristic in relation to a concept. A high salient characteristic is one that is very prominent for a concept. For example, the color, red, is a high salient property of an apple. A low salient characteristic is nonobvious and unapparent. The characteristic, ripens, might be a low salient property of an apple. Nonliteral statements involve mixed salience in which the terms share properties that are of low salience for one object and high salience for the other. Moreover, there is a fixed order of salience in nonliteral statements. The ground is of low salience for the first term (i.e., the topic) and of high salience for the second term (i.e., the vehicle). In the surgeon/butcher example, "works in a coarse way," is a more salient characteristic of butchers than of surgeons. According to this view, both indirect similarity statements (i.e., X is Y) and explicit similarity statements (i.e., the simile form, X is like Y) are nonliteral if their grounds are based on this kind of ordered, mixed salience (abbreviated, LH). Literal statements involve properties that are of high salience for both terms. For example, "The surgeon is like a pediatrician," is literal because surgeons and mixed salience condition illustrates an important feature of metaphor. Metaphors express something unusual or hidden (i.e., something of low salience) about the topic via the comparison with the vehicle. In the example above, the workmanship of the surgeon is characterized in terms of the workmanship of butchers. This type of comparison is directed. The topic (X) is examined in terms of the vehicle (Y). The direction effect is determined by the linguistic structure of

metaphor. The linguistic forms, "X is Y," and "X is like Y," are both directed comparisons. This direction effect is well illustrated by examining the change in meaning that results when the topic and vehicle are reversed in the sentence. In the example above, "The surgeon is a butcher," becomes "The butcher is a surgeon." The meaning of each sentence results from examining the topic in terms of the vehicle.

Nondirected comparisons lack this direction effect. The forms, "X and Y are alike," and "X and Y resemble each other," do not specify a direction for comparing X and Y. For example, "The surgeon and the butcher are alike," has the same meaning as, "The butcher and the surgeon are alike." In addition, the meaning of the nondirected comparison in this case is different from the directed comparison.

In summary, metaphors can be indirect (i.e., X is Y) or explicit (i.e., X is like Y) similarity statements. They are based on grounds which are low salient properties of the topic (X) and high salient properties of the vehicle (Y). Metaphors involve directed comparisons in which something nonobvious about the topic is expressed through a comparison with salient properties of the vehicle.

Comprehension of metaphor

A metaphor is interpreted by determining its relevant ground properties. Thus, a central component of metaphor comprehension consists of identifying similarities between the topic and the vehicle. This process is guided by the linguistic form of metaphor. According to several theories, this involves generating properties of the vehicle and applying them to the topic. The properties are then

evaluated to determine which ones can be accepted by the topic (Glucksberg, Gildea, & Bookin, 1982; Ortony, 1979). This process is directed in the sense that vehicle properties are transferred to the topic but topic properties are not transferred to the vehicle. This is what is meant by the claim that the topic is examined in terms of the vehicle.

Furthermore, it is assumed that the properties generated from the vehicle are salient ones (Ortony, 1979). This directed transfer of high salient properties from the vehicle to the topic probably accounts for the relative ease of metaphor comprehension by adults. The ground characteristics of metaphors are highly salient for the vehicle and are probably generated early during attempted comprehension. For example, suppose an individual hears the statement, "A leaf is like a boat." The comprehension process begins with the generation of high salient characteristics of boats. This might include such characteristics as, "floats," "found in water," "mode of transportation," and so on. These are applied to the concept leaf and evaluated to determine which, if any, can apply to leaves. In order to determine the ground properties of metaphors, individuals must be able to find similarities that are based on ordered, mixed salience (i.e., low-high) and carry out the directed transfer of high salient properties from the vehicle to the topic.

Children's Metaphor Comprehension

Several factors have been identified as sources of difficulty in metaphor comprehension for children. These include:

1. the indirect linguistic form of metaphor.
2. the nature of the similarity relations expressed in metaphors.
3. methodological factors that increase the difficulty of the comprehension task.

Previous research has not focused directly on the process of identifying grounds in similarity statements. The purpose of this study is to examine this process and to determine whether young children:

1. can identify grounds when they are based on the type of mixed salience that characterizes metaphor (i.e., LH).
2. use the linguistic structure of metaphor to make directed comparisons to find similarities between the topic and the vehicle. This involves the transfer of properties of the vehicle to the topic.

This study examines the effects of salience, linguistic form and salience order on children's ability to identify similarities between objects. These factors are described below.

The effects of salience on ground identification are examined by comparing children's performance on high salience grounds (in which the shared characteristic is of high salience for both terms) with mixed salience grounds (in which the shared characteristic is of high salience for one term and low salience for the other).

It is hypothesized that high salience grounds will be easier to identify than mixed salience grounds. This prediction is based on the idea that high salience properties should be more accessible than low

salience properties. It should be easier to generate the property for both objects when it is highly prominent for both of them than when the property is obscure or unapparent for one of the objects. In a mixed salience ground, the property may be overlooked in the term for which it has low salience.

The study examines children's ability to identify ground characteristics when they are expressed in directed comparisons (i.e., X is like Y) and in nondirected comparisons (i.e., X and Y are alike). This manipulation tests whether children are sensitive to the linguistic structure of metaphor and can use that structure to make directed comparisons between the terms.

It is hypothesized that directed comparisons will be easier than nondirected comparisons. Directed comparisons should be easier because they specify a systematic procedure for comparing the topic and the vehicle. The directed form tells the listener to compare one object to the other. Nondirected comparisons merely tell the listener to compare the objects without specifying a way to make the comparison.

Children's abilty to use the directed transfer of vehicle properties to the topic is examined by manipulating the order of the terms in directed comparisons that are based on mixed salience. In metaphors, the ground is a low salient property of the topic (X) and a high salient property of the vehicle (Y). This ordering of salience is referred to as the forward order (i.e., LH). The reverse order (i.e., HL) is created by exchanging the positions of the terms in the statement. The ground property becomes a high salient characteristic of the topic and a low salient property of the vehicle. For example,

the statement, "A leaf is like a boat," is in the forward order since the ground, "floats," is a low salient property of leaves and a high salient property of boats. The statement, "A boat is like a leaf," reverses the ordering of salience.

It is hypothesized that ground identification for directed comparisons that are based on mixed salience will be easier in the forward order (i.e., L is like H) than in the reverse order (i.e., H is like L). The forward order should be easier because the ground is a high salient property of the vehicle and should be accessed relatively easily. However, in the reverse order, the ground is a low salient property of the vehicle and should be more difficult to generate. This analysis will provide evidence about whether children find similarities in metaphor by transferring vehicle properties to the topic.

There should be no word order effect for the directed comparisons that are based on high salience (i.e., H is like H), since the ground is a high salient property in both the forward and reverse orders. For example, the ground, "square," should be just as easy to identify in the forward order, "A box is like a block," as in the reverse order, "A block is like a box," because it is a high salient property of both objects.

In addition, there should be no word order effects for the nondirected comparisons because the form does not specify the directed transfer of properties. For example, "A leaf and a boat are alike," should be equal in difficulty to the reverse statement, "A boat and a leaf are alike."

Method

Subjects

The subjects were 72 children enrolled in a preschool in LaCrosse, Wisconsin. There were 36 boys and 36 girls. The children ranged in age from 4;0 to 4;11. The mean age was 4;7 and the median age was 4;7.

Materials

Stimulus materials consisted of 18 object pairs. The objects were selected from a larger pool of objects that had been rated for salience by a group of 35 adults. The salience rating task was used to determine which properties were of low and high salience in relation to the objects. The objects were then pretested on a group of 40 four-year-olds. The pretest was used to control for prior knowledge of the objects and their properties. Only objects and properties known by 90% of the pretest group were selected for the comprehension task.

Each object pair shared either a physical property or an action characteristic. These characteristics are called the target grounds and comprise the primary bases of similarity between the objects as determined by the experimenter. The object pairs and their target grounds appear in Table 1.

The object pairs varied between conditions in linguistic form and word order and within conditions in salience relationship. These conditions are described below.

Linguistic Form

Two forms of similarity statements were used. In one condition both objects in the comparison appeared as the subjects of the

sentence. These are called nondirected comparisons and take the form, "X and Y are alike." The other linguistic form is a directed comparison, "X is like a Y." This form is the same as the figure of speech known as simile.

TABLE 1

OBJECT PAIRS AND THEIR TARGET GROUNDS

High Salience Object Pairs	Target Grounds
Box, Block	shape; square
Giraffe, Tower	shape; long, tall, big
Pepper, Dirt	color; black
Soap, Ice	texture; slippery
Marshmallow, Pillow	texture; soft
Superman; Airplane	action; fly
Teeter totter, Elevator	action; up/down
Ball, Kangaroo	action; bounce, go up/down
Zebra, Candy cane	appearance; striped
Oven, Sun	perceptual; hot
Mixed Salience Object Pairs	**Target Grounds**
Hair, Spaghetti	shape; long, thin
Egg, Marble	shape; round- action; roll
Gum, Glue	texture; sticky
Frosting, Snow	color; white
Leaf, Boat	action; floats
Licorice, Rubberband	action; stretches
Fat, Jello	action; wiggles, wobbles
Baby, Alarm clock	action; makes noise, wakes you

Salience

Salience relationship within a pair was varied to create high salience and mixed salience. Ten object pairs were based on target grounds which were of high salience. Eight mixed pairs were based on a discrepancy between the salience of the ground for the objects in a pair. The target ground was of high salience for one object and low salience for the other.

Word Order

Two conditions of word order, forward and reverse, were created. Word order refers to the ordinal position of the objects in the statement. The orders were determined differently for the high salience pairs than for the mixed salience pairs.

In the mixed salience condition, the forward order was determined by assigning the objects rated low on salience to the first position in the sentence and the objects rated high on salience to the second position (abbreviated, LH). This is the salience relationship characteristic of metaphor (Ortony, 1979). The reverse order was created by exchanging the objects in the statement. This resulted in statements in which the object with high ground salience appeared in the first position and the object with low ground salience appeared in the second position (abbreviated, HL).

The forward order for the high salience items was determined by assigning arbitrarily one of the two objects to the first position and the other object to the second position. The reverse order was created by exchanging the objects from the forward order condition.

Design

The experiment was a 2 (Word order: forward vs.reverse) X 2 (Salience relationship: high salience vs. mixed) X 2 (Linguistic form: directed vs. nondirected) factorial design. Word order and linguistic form were between subjects factors and salience relationship was a within subjects factor.

Four experimental conditions of object pairings were constructed that differed in the linguistic form of the similarity statements and order in which the objects appeared in the statements.

These conditions are:

1. Directed comparisons in the forward order: X is like Y.
2. Directed comparisons in the reverse order: Y is like X.
3. Nondirected comparisons in the forward order: X and Y are alike.
4. Nondirected comparisons in the reverse order: Y and X are alike.

A protocol for each condition was constructed. Each contained ten high salience balance and eight mixed salience object pairs. The eighteen items were randomized within two blocks of nine items each. Each block contained five high salience pairs and four mixed salience pairs in randomized order. There were two blocks for each of the four sets.

Procedure

The subjects were randomly assigned to one of the four experimental conditions. Each subject was tested individually in a quiet area outside of the classroom. All of the children completed the task in one session which was typically 20 to 30 minutes in length.

Each child received a practice item (e.g., "A wheel is like a ball" or "A wheel and a ball are alike," depending on the linguistic form condition.). If the child did not respond to the practice item, the experimenter provided an appropriate response (i.e.,"They are round" or "They roll") and then proceeded with the task.

Each item consisted of a similarity statement followed by a question about the objects in the statement. In the nondirected condition, items were in the form," X and Y are alike. How are they alike?". Items in the directed condition were in the form, "An X is like a Y. How is an X like a Y ?"

Data Scoring

Responses were sorted into three general categories depending upon whether they contained a ground property (i.e., a specific characteristic that applied to one or both objects in a pair) and whether the ground was the target ground (i.e., the ground identified by the experimenter). This categorization resulted in three types of responses: nonground responses, nontarget ground responses and target ground responses. A summary of the scoring decisions is presented in Figure 1.

The nonground responses did not specify similarities between the objects or name properties of the objects. They included: repeat responses, assertions of equivalence, responses unrelated to the item and responses indicating that the child did not have an answer. The nonground responses were omitted from further scoring. Ground responses were analyzed in several other ways.

Identification of the Ground in the Responses. Two categories of ground responses were distinguished. Target ground responses contained the ground properties on which the items were constructed. The target grounds comprised the primary bases of similarity between the objects and had previously been evaluated for their salience levels (see Table 1). The second category consisted of nontarget ground responses. These

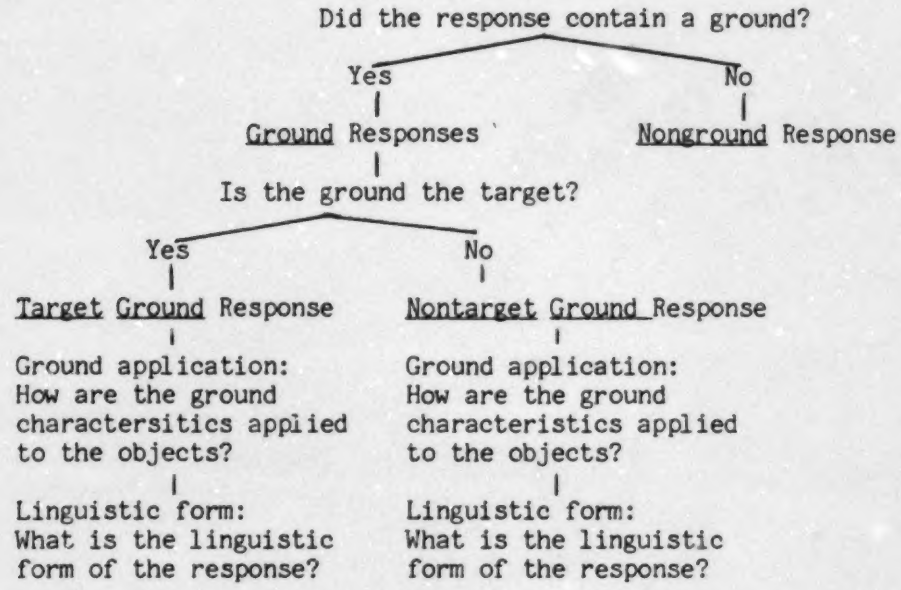
Did the response contain a ground?
Yes
No
Ground Responses
Nonground Response
Is the ground the target?
Yes
No
Target Ground Response
Nontarget Ground Response
Ground application: How are the ground characersitics applied to the objects?
Ground application: How are the ground characteristics applied to the objects?
Linguistic form: What is the linguistic form of the response?
Linguistic form: What is the linguistic form of the response?

Figure 1 . Data Scoring

Identification of the Ground in the items. Two categories of ground responses were distinguished. Target ground responses contained the ground characteristics on which the items were constructed. The target grounds comprised the primary bases of similarity between the objects and were previously evaluated for their salience levels (see Table 1). The second category consisted of nontarget ground responses. These specified other similarities between the objects or properties of the objects. The interscorer reliability for the identification of both target and nontarget ground responses was .95, N=100.

Application of the Grounds in the Items. Ground responses were scored next to determine how the ground characteristics were assigned to the objects in the items. This scoring distinguished responses that

distinctions can help to determine the extent to which children were specified similarities from those that named differences between the objects or merely named a property of one of the objects. The interscorer reliability was .92 for scoring the ground application of both target and nontarget ground responses.

Linguistic Form. Ground responses were scored for linguistic form. Responses were sorted according to whether the form of the response focused on one, both or neither of the objects. These sensitive to the form of the statements they heard. For example, the directed comparison item (i.e., X is like Y. How is X like Y?) might elicit more responses that focus on the topic of the item (i.e., names the topic or uses the term, "it's...."). This response form is appropriate for directed comparisons but would be unusual for nondirected comparisons (i.e., X and Y are alike. How are X and Y alike?). Interscorer reliability for the linguistic form category was .93, N=100.

In sum, all ground responses were scored to determine:

1. the presence of the target or nontarget ground.
2. how the grounds were applied to the objects.
3. the linguistic form of the child's response.

Results and Discussion

The results are organized into two sections. Section one is mainly descriptive. It contains the overall distribution of responses and determines whether the children were sensitive to the linguistic form of the similarity statements. The second section examines the effects of the independent variables, salience linguistic form and word order on the identification of grounds.

Descriptive Overview of Responses

Ground vs. Nonground Responses

Table 2 contains the percentages of the different types of ground and nonground responses across all conditions on the first trial.

TABLE 2

PERCENTAGES OF GROUND AND NONGROUND RESPONSES ON THE FIRST TRIAL

Ground Responses	Percent on First Trial
Target ground	52.1
Nontarget ground response	30.6
Nonground Responses	
No response	9.9
Unrelated to the item	3.4
Repeat of previous response	1.9
Vague equivalence or difference	1.4
No prior knowledge	0.7
	Total N = 1296

Ground responses comprised nearly 83% of the responses on the first trial and are the data of interest. Nonground responses were omitted from further analysis.

The Linguistic Form of Ground Responses

The linguistic forms of both target and nontarget ground responses were analyzed to determine whether children were sensitive to the form of the similarity statements they heard. Sensitivity to the difference between the directed and nondirected forms should be reflected in the linguistic form of responses. For example, the directed comparison (X is like Y. How is X like Y?) should produce

responses that use a singular subject and verb (e.g., "It is . . ." or "An X is . . ."). This form is inappropriate for nondirected comparisons. Nondirected comparisons (X and Y are alike. How are X and Y alike?) should have more responses in which the subject and verb are plural (e.g., "They are both . . . " or "X and Y are . . ."). This form would also be acceptable for directed comparisons. The differences between the response forms for the directed and nondirected conditions were analyzed.

There was a higher proportion of plural subject, verb responses (e.g., "They both . . .") in the nondirected condition than in the directed condition (i.e., .70 vs. .23, respectively). The difference between the means for the directed and nondirected comparisons for this response type was significant, $t(70) = 6.16$, $p < .001$.

The singular subject, verb response (e.g., "It is . . .") was more frequent for the directed condition (.30 vs. .004, respectively). The difference between the means for this response form was significant, $t(70) = 6.63$, $p < .001$.

The response form in which there was reference to only one object (i.e., You . . . an X) was used more frequently in the directed condition (i.e., .14 vs. .083). The difference between the means for this form was significant, $t(70) = 2.08$ $p < .05$. There was also a greater proportion of responses that only named a characteristic and no object in the directed condition (i.e., .18 vs. .06). The difference between the means for this form was also significant, $t(70) = 3.36$, $p < .05$.

Children used a linguistic form for their responses that was consistent with the linguistic form of the similarity statement that they heard. The predominant response form in the nondirected condition used a plural subject and verb (e.g., "They both . . ."). Although this form is also appropriate for the directed condition, it was used less frequently. In the directed condition, the singular topic-comment form (e.g., " It is . . .") was used in 30% of cases. This form is an inappropriate response to nondirected statements and children in the nondirected condition almost never used it.

Application of the Grounds

Ground reponses were analyzed to determine how the grounds were assigned to the objects. The most appropriate response to a similarity statement is one in which the same value of the ground is assigned to both objects (e.g., "A box and a block are square"). This is a similarity response. Other responses may not be based on similarity. For example, the child may identify a ground for an object pair but apply it to only one of the objects in the pair (e.g., "A box is square but a block isn't").

The children produced similarity responses in the great majority of the cases (i.e., 82.5% of the ground responses across conditions). However, they also produced responses that asserted differences between the objects in about 5% of the cases (e.g., "A box is square and a block is round") and responses in which the ground was assigned to only one object in a pair in about 8.5% of the cases (e.g., the child said, "A boat floats," but did not apply the characteristic to the other object, leaf).

Summary of Section One

Children identified a ground characteristic in 83% of the cases. The target was identified in 52% of the cases on the first trial. They tended to produce well-formed similarity responses when they identified a ground. Children were sensitive to the linguistic form of the similarity statements to the extent that the form of their responses tended to be consistent with the form of the statement they heard.

The Effects of Salience, Linguistic Form and Word Order on Ground Identification.

Target and nontarget grounds comprise different kinds of data for the purposes of this study. Target grounds consist of the primary points of similarity between the object pairs as determined by the experimenter. The major focus of this study is to examine the extent to which children can identify the targets under different conditions of salience, linguistic form and word order. Target grounds were, therefore, treated as "correct" responses and analyzed separately from the nontarget responses.

Salience and Linguistic Form

It was hypothesized that salience would influence the identification of target grounds. The prediction was that high salience object pairs would be easier than mixed salience object pairs (i.e., HH > LH, HL), for both directed and nondirected comparisons. The effects of salience on target ground production were tested by analyzing the difference between the high and mixed salience objects pairs in directed and nondirected comparisons.

A second hypothesis was that linguistic form would influence target ground production. The prediction was that directed comparisons would be easier than nondirected comparisons (i.e., X is like Y > X and Y are alike).

Table 3 contains the proportion of similarity responses for both conditions of salience (i.e., high vs. mixed) and linguistic form (i.e., directed vs. nondirected).

TABLE 3
PROPORTION OF FIRST TRIAL SIMILARITY RESPONSES

Statement Type	Salience Relationship	
	High (H-H)	Mixed (L-H, H-L)
Directed Comparisons (X is like Y)	.53	.45
Nondirected Comparisons (X and Y are alike)	.54	.34

The distributions of responses in the four experimental conditions were slightly skewed. Therefore, logarithmic transformations were computed on the dependent variables for subsequent ANOVA's. The transformed dependent variable was used because it is more sensitive to the variability in the data.

The transformed dependent variable was used in a 2 X 2 ANOVA with statement type and salience relationship as independent variables. The main effects for salience were significant, $F(1,143) = 9.71$, $p < .05$. High salience object pairs were easier than mixed salience pairs. The main effects for statement type were significant, $F(1,143) = 6.38$, $p < .05$. Directed comparisons were easier than nondirected comparisons. This difference was due to the interaction between statement type and salience, $F(1,143) = 5.53$, $p < .05$.

The hypothesis that high salience pairs would be easier than mixed salience pairs was supported by both analyses. Directed comparisons were easier than nondirected comparisons. However, this was due to an interaction between linguistic form and salience. Directed comparisons were easier than nondirected comparisons when they were based on mixed salience. There was no difference between the proportions of similarity responses for directed and nondirected comparisons for the high salience object pairs (L is like H > L and H are alike; H is like H = H and H are alike).

Nontarget ground responses were examined to determine whether there were differences in these responses that could explain the interaction between salience and statement type. The analyses of nontarget ground applications shows that most nontarget responses (71%) were similarity responses. However, children produced a greater proportion of difference responses for the nondirected comparisons than for the directed comparisons. An explan- ation for this difference is that children might interpret the non- directed form, X and Y are alike, as a statement of equivalence as if it meant something like, X and Y are the same. If children are not able to find the "sameness" between X and Y, they may conclude that X and Y are different and, therefore, produce a difference response. This may, in part, explain the interaction between salience and linguistic form Children produced fewer target responses in the nondirected condition because they were more likely to interpret the statement as an assertion of identity. When the target was not accessible to them they concluded that the objects were different.

Summary of form and salience effects

As predicted, high salience object pairs were easier than mixed salience pairs. This was true for both directed and nondirected comparisons. There was an interaction between linguistic form and salience. Directed comparisons were easier than nondirected comparisons when they were based on mixed salience. There was no such difference for the high salience pairs. The analysis of nontarget ground applications showed that there were a greater number of difference responses in the nondirected condition. This indicates that children may interpret the two forms differently. The directed form (X is like Y) indicates that there is a specific similarity between X and Y. The nondirected form (X and Y are alike) may be interpreted by the child as, "X and Y are the same". The greater number of different responses in the nondirected condition helps to explain the interaction between salience and form.

Order

The effects of word order on target ground identification were analyzed by comparing the difference in the proportion of similarity responses between the forward and reverse orders for the directed and nondirected comparisons.

It was predicted that the forward order would be easier than the reverse order for the mixed salience pairs in directed comparisons (i.e., L is like H > H is like L). There should be no order effect for the high salience object pairs in directed comparisons (i.e., H is like H = H is like H). In addition, there should be no word order effect for nondirected comparisons for either high or mixed salience

object pairs (i.e., L and H are alike = H and L are alike; H and H are alike = H and H are alike).

Table 4 reports the proportion of similarity responses for mixed salience object pairs.

TABLE 4
PROPORTION OF FIRST TRIAL SIMILARITY RESPONSES TO MIXED SALIENCE OBJECT PAIRS

Statement Type	Word Order	
	Forward (LH)	Reverse (HL)
Directed Comparisons (X is like Y)	.40	.47
Nondirected Comparisons (X and Y are alike)	.34	.35

A logarithmic transformation was computed on the dependent variable. This transformed variable was used as a dependent measure in a 2 X 2 ANOVA with statement type and word order as between subject factors. The main effects for word order were not significant, $F(1,72)= 1.33$, $p > .05$. There was no difference in difficulty between the forward and reverse orders. The main effects for statement type were significant, $F(1,72)= 6.65$, $p < .05$. Directed comparisons were easier than nondirected comparisons. The interaction between statement type and word order was not significant, $F(1,72) < 1.00$, $p > .05$.

In sum, there were no differences in difficulty between the forward and reverse orders. This refutes the prediction that the forward order would be easier than the reverse order for mixed salience object pairs in directed comparisons. Directed comparisons were easier than nondirected comparisons in both analyses. This

corroborates the finding from the previous analysis of salience and form that directed comparisons are easier than nondirected comparisons for mixed salience object pairs.

High salience objects pairs were similarly analyzed to determine the effects of order on target ground identification. It was hypothesized that there would be no differences between directed and nondirected comparisons or between forward and reverse orders.

A logarithmic transformation was computed on the dependent variable. The transformed dependent variable was used in a 2 X 2 ANOVA with statement type and word order as between subjects factors. The main effects for statement type and word order were not significant, $F(1,72) < 1.00$, $p > .05$ for both factors. The interaction between statement type and word order was not significant, $F(1,72) = 1.63$, $p > .05$.

In summary, order had no effect on the difficulty of ground identification for directed or nondirected comparisons. The finding that the reverse order was no more difficult than the forward order for mixed salience pairs in directed comparisons indicates that children may not engage in the process of applying properties of the vehicle to the topic in order to determine similarities between the objects.

General Summary

This study has shown that young children have several abilities and some limitations that are relevant for understanding metaphorical language. They are sensitive to the linguistic form of similarity statements and they are capable of finding similarities that are based

on the ordered, mixed salience that characterizes metaphor.

However, it was also shown that they may interpret the nondirected form of similarity statement in a way that differs from adults. They may view it as a statement of identity. This possibility needs to be examined by further research.

Children also have greater difficulty with mixed salience grounds than with high salience grounds. They had greater difficulty generating low salient properties even though the pretest had ensured that they knew those properties.

The manipulation of salience order had no effect on their ability to identify the target grounds. This is an interesting finding since it suggests that they do not engage in the kind of directed processing that is supposed to typify effective metaphor comprehension.

The results support what might be called a "race" model of comprehension. According to this model, children generate properties from either the topic or the vehicle (possibly both) and apply them to the other object in the pair. The "race" involves competition among properties based on their salience. High salient properties generated first may block the appearance of low salient properties and thus make the ground more difficult to determine in mixed salience grounds.

This model remains to be tested by further research. In addition, it would be of interest to determine how and when children begin to use directed processing to determine the relevant ground properties in metaphorical statements.

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